

Amendment re:09/788,437

Page 10 of 12

REMARKS**Claims**

Claims 1-21 and 30-43 remain pending. Claims 1 and 30 have been amended for clarity. Each of claims 1 and 30 positively recites a substrate. The scope of claims 1 and 30 is submitted to be unaltered by this amendment. It is submitted that the pending claims comply with all requirements of 35 U.S.C. §112.

Claims 13-15 and 37

Claims 13-15 and 37 have been indicated as being directed to allowable subject matter. Claims 13 and 37 have been amended to be independent. Therefore, claims 13 - 15 and 37 are submitted to be allowable.

Claims 1-12, 16-21 and 30-43

The Office Action raises Chou et al. in combination with various other references in relation to pending claims 1-12, 16-21 and 30-43. The Applicant submits that the cited references fail to teach or suggest the claimed apparatus.

Claims 1 and 30

These claims recite that the member is "adherent by stiction to a surface". Chou specifically teaches away from allowing stiction to occur between the member and the surface. For example:

- Chou's Abstract states "an anti-stiction method was used in several steps of the process including a crucial freeze-drying one";
- The entire section on page 389 entitled "Anti-Stiction" wherein Chou begins by stating that "Stiction is a notorious cause of malfunction in microdevices." Chou then explains a t-butyl alcohol freeze drying method intended to avoid having the fabricated structure pulled down to the substrate surface. Chou concludes by stating that "[A] Pirani sensor ... was fabricated without the problem of stiction."

In the face of Chou's clear and explicit teaching that stiction is to be avoided, a routineer in the art would not be motivated by Chou in combination with Sparks et al. to provide a member adherent by stiction to a substrate as claimed in claims 1 and 30.

The Office Action suggests that one would combine Chou with the teaching of Sparks et al. to yield the claimed pressure sensor. This is incorrect. Sparks et al. is cited for the wafer-to-wafer bonding disclosed at col. 2, ln. 22-35 and col. 5, ln. 22-26. Sparks et al.

Amendment re:09/788,437

Page 11 of 12

state that "The bonding operation ... yields a hermetic seal..." (col. 2, ln. 31-2) and "[T]he resulting wafer-to-wafer bond forms a hermetic seal around the cavity ..." (col. 5, ln. 25-7). If Chou's heated element were bonded to the substrate of Chou's device using Spark's wafer-to-wafer bonding which provides a hermetic seal then Chou's device could not function. As described in Chou's section entitled Device Physics which begins on page 384, Chou's device requires a gas whose pressure is to be measured to be able to enter the space between the substrate and the heated element (see also Figure 1 of Chou). A hermetic seal would prevent gas from entering this space. It was therefore not obvious to combine Chou et al. and Sparks et al. in the manner suggested by the Office Action.

In light of the above, it is submitted that claims 1 and 30 are patentable over Chou et al. and Sparks et al.

Claims 2-12 and 16-20 depend from claim 1. Claims 31-40 depend from claim 30. Claims 2-12, 16-20 and 31-40 are all also submitted to be patentable over Chou et al. and Sparks et al. for at least this reason. These dependent claims also include features which further distinguish the cited references. For example:

- claims 17 and 39 recite that "the surface of the substrate is patterned with a pattern of plateaus and valleys in its portion under the member". The cited references fail to disclose a substrate patterned with a pattern of plateaus and valleys in its portion under a member.
- claims 11 and 35 recite a bridge having "a central portion collapsed onto and adhering by stiction to a surface of the substrate". In relation to these claims, the Office Action suggests that Schieferdecker et al. disclose at col. 5, ln. 5-24 a bridge having a central collapsed portion. This is incorrect. Shieferdecker does not disclose a bridge having a collapsed portion, as claimed.

Therefore, the Applicant submits that all of claims 1-12, 16-20 and 31-40 are allowable.

Claims 21 and 41-43

Claims 21 and 41 have been amended to provide antecedent reference for the term "substrate". As the substrate is clearly the claimed semiconductor wafer, the scope of these claims is not altered by this amendment.

Claims 21 and 41 each recite "an electrically conductive member in physical contact with the surface [of the wafer]". The Office Action asserts that Chou discloses a surface of a member in contact with a substrate. This is incorrect. Chou's member "floats" with its

Amendment re:09/788,437

Page 12 of 12

surface spaced apart from the substrate by a narrow gap (see Figure 1, and the bottommost drawing in Figure 4). See also the beginning of Chou's section 3 which states "Floating microstructures with shallow gaps underneath can be made by surface micromachining techniques ... In our device, polysilicon is used as a sacrificial layer to form small spacings." Chou deliberately creates a floating member which is not in physical contact with the underlying substrate. Therefore, Chou does not disclose this feature of claims 21 and 41. Therefore, claims 21 and 41 are submitted to be allowable.

Further, claims 21 and 41 claim a surface roughness in the specific range of "nanometers to tens of nanometers". The Office Action contends that "every surface has some degree of roughness". The Applicant points out that the cited references do not discuss the specifically claimed range of surface roughness, nor do they provide a pressure measurement mechanism having a surface having a roughness in this range at the interface between a member and a substrate with which the member is in physical contact. Surface roughness, in general, is an inherent characteristic of surfaces. Surface roughness in the range of nanometers to tens of nanometers, as claimed in claims 21 and 41, is not inherent in all surfaces. Many surfaces have surface roughnesses outside of this range.

In light of the foregoing, the Applicant submits that claims 21 and 41, and claims 42 and 43 which depend from claim 41, patentably distinguish the cited references.

Conclusion

In light of the foregoing amendments and remarks, it is submitted that claims 1-21 and 30-43 are all in condition for allowance. Reconsideration and allowance of this application is respectfully requested. The Examiner is invited to contact the undersigned by telephone at (604) 669-3432 to discuss any outstanding issues.

Respectfully submitted,

By: 

Gavin N. Manning
Registration No.: 36,412
Tel. No.: (604) 669-3432
Fax No.: (604) 681-4081